

Thinking about manufacturing automation?

4 paths to successful implementation

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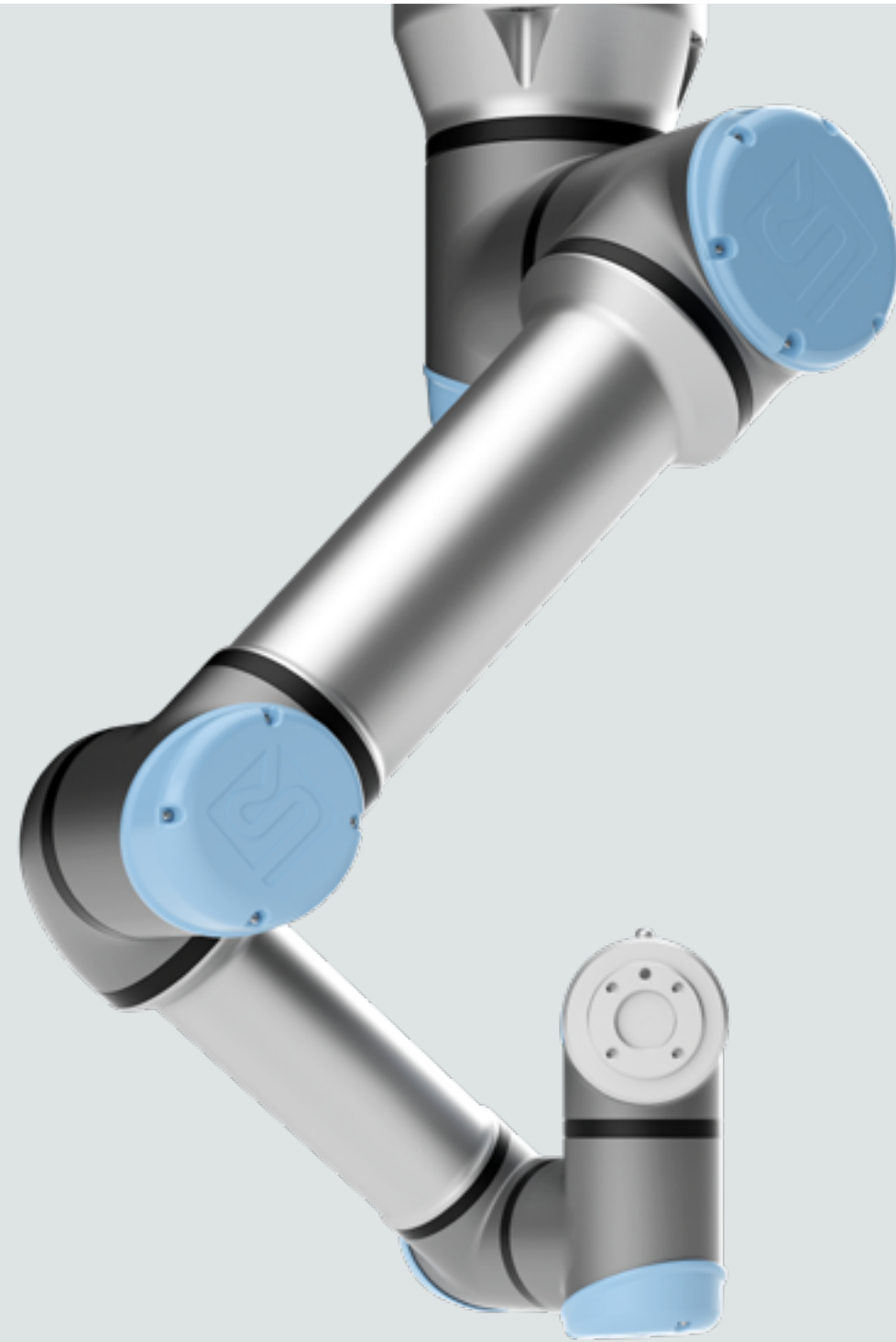


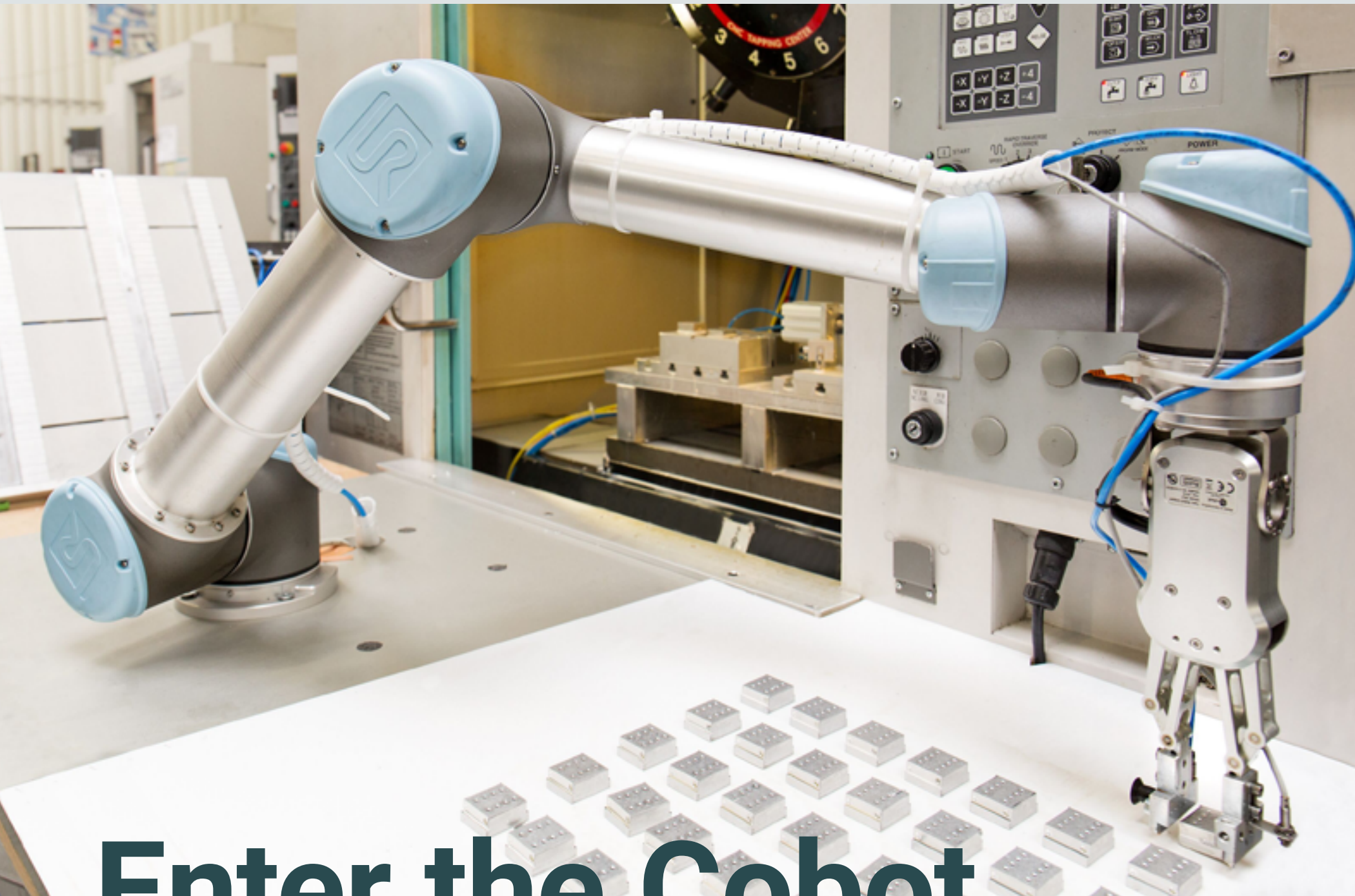
Let's get started

Traditionally, the engineering, installation and startup of robot cells has required the expertise of dedicated systems integrators.

For large manufacturers, the months-long process and high cost are required by the complexity of the process and the scope of the projects. This traditional approach is often called All-or-Nothing automation, as every step in the process must be fully automated to justify the large investment.

However, it's been a different story for the more than 250,000 small and medium-sized manufacturing enterprises (SME's) in North America. For SME's, there was little hope of justifying the investment in high-cost / high complexity traditional automation. For decades the technical and financial barriers have left this critical segment significantly under-served by the traditional automation providers.





Enter the Cobot

The opportunity for small manufacturers changed dramatically just a few years ago with the introduction of collaborative robotics (cobots)

Cobots have brought two critical changes to the traditional automation approach.

First, with a risk assessment and proper configuration of safety protocols, collaborative robots can be safely deployed side by side with skilled operators. This feature alone breaks the All-or-Nothing paradigm of the traditional approach, enabling manufacturers both large and small to make incremental investments in automation, one process step or station at a time.

The second critical attribute of collaborative robots is a

radically new approach to programming, set up, deployment and overall ease-of-use. In many cases, cobots are successfully deployed by manufacturing and operations personnel, not robot specialists or programmers.

This process simplification has decreased the time and cost to deploy cobots, making these solutions ½ to 1/3 the cost of traditional automation. With lower complexity and relative ease-of-integration, cobots are empowering small manufacturers to not just survive but to thrive.

The four integration Models

To find the right path to an automated solution, manufacturers should begin with careful consideration of their application to define the requirements for success, identify needs, and measure those needs against existing in-house capabilities. Here are the four integration options available for consideration.



The DIY Model

Expand your toolbox with a Do-It-Yourself approach



Lean Integrator

Focus on a specific set of industrial applications



Value-Add Distributor

Distributors adding value by providing technical assistance



Traditional Integrator

Integration specialized in every type and multiple departments

#1 The DIY Model

Because Cobots do not require advanced programming or engineering teams for deployment of basic projects, manufacturers can confidently consider a do-it-yourself (DIY) approach to integration. **In fact, cobots make a do-it-yourself (DIY) integration easier to accomplish by reducing engineering and programming time, training and site prep.**

A variety of online and DIY tools are available to help first-time adopters navigate the challenges of designing and implementing cobot automation:



Education and Training

Examples of available education tools include: Universal Robots' [UR Academy](#) which offers free 2-hour online training sessions as well as instructor led classes; UR's Application Risk Scorecard which allows users to compare workcells for automation; and the [Application Builder](#), which helps manufacturers analyze their internal capabilities, applications, and available solutions to determine whether they have the horsepower for a DIY solution.

Peripherals and Accessories

Depending on the application need, peripheral requirements will vary. UR has a network of trusted partners whose peripherals and accessories are certified to be a functional fit with UR cobots, both mechanically and electrically. Certified software and documentation are also provided. These partners are referred to as the [UR+ Ecosystem](#). Their products help reduce engineering time, cost and risks that are typical of adding peripherals to a robot cell.



Application Risk Scorecard

This checklist covers nearly 40 factors, ranging from customer requirements for manufactured products to existing equipment, the facility that will house the equipment, and the overall manufacturing process. By ranking the risk of each item on the checklist, companies can get a quick feel for how much risk is involved and compare that risk against the cost of an external automation partner. [Contact your local UR representative](#) to receive the scorecard.

Clearly, a DIY approach is a viable and [proven option for many manufacturing applications](#). However, it is not an appropriate model for every company and project. There are cases where some level of outside integration is required and not all integrators are the best option for every project.

Application Builder

This free online tool helps customers create a visual simulation of the cobot workcell. By answering a few questions, manufacturers can lay out their workcells and start selecting equipment, such as robots, end-effector tools, and operator interfaces. A coding program template is generated which can be used by either in-house engineers or outside integrators to build a successful cobot solution.

UR+ Ecosystem

More than 350 trusted automation solution providers help new adopters and integrators alike find out which gripper, tool changer, or vision system will work seamlessly with Universal Robots' control software, reducing client risk and speeding deployment times.



#2 Value-Add Distributor

Some distributors will provide technical assistance to help facilitate a sale. Known as value-add distributors they typically recommend configurations, peripherals, and options and provide software support to tie all the pieces together. In most cases, the end-user is responsible for some of the design and all the commissioning and installation of the project.

#3 Lean Integrators

If a manufacturer needs more assistance and a larger service set, a lean integrator is the next consideration. Lean integrators focus on a specific set of industrial applications. For example, one lean integrator might be an expert in TIG welding, and another in material removal applications. Lean integrators like small footprints and low overhead, often employing only 10 or 20 staff members and occupying 10,000 square feet of floor space or less. Project teams are small and cross-disciplined. While these factors may seem limiting at first glance, lean integrator processes are very nimble. Consequently, their lead times are usually

measured in weeks not months. In addition to focusing on specific applications, lean integrators usually prefer to buy versus build when it comes to peripherals, tooling, and components. This means workcells can be deployed more quickly and cost-efficiently.



#4 Traditional Integrators

Traditional integrators make up the final group. These integrators build robot workcells of every type, including traditional robots and cobot based solutions. They are ISO-compliant, process-driven, built around large-scale project execution, and typically measure lead times in months. Traditional integrators are very specialized and have many departments, including multiple engineering disciplines, mechanical controls, programming, and simulation. Their supply chain is very robust and is engaged directly with the production and quality needs of cobot workcells.



**So, what's best for
your operation?
A Value-Add Distributor,
Lean Integrator, or
Traditional Integrator?
Or should you do
it yourself?**

Key Factors for Choosing the Integration Model

The final choice between a DIY approach or partnering with an outside integrator comes down to several key factors:

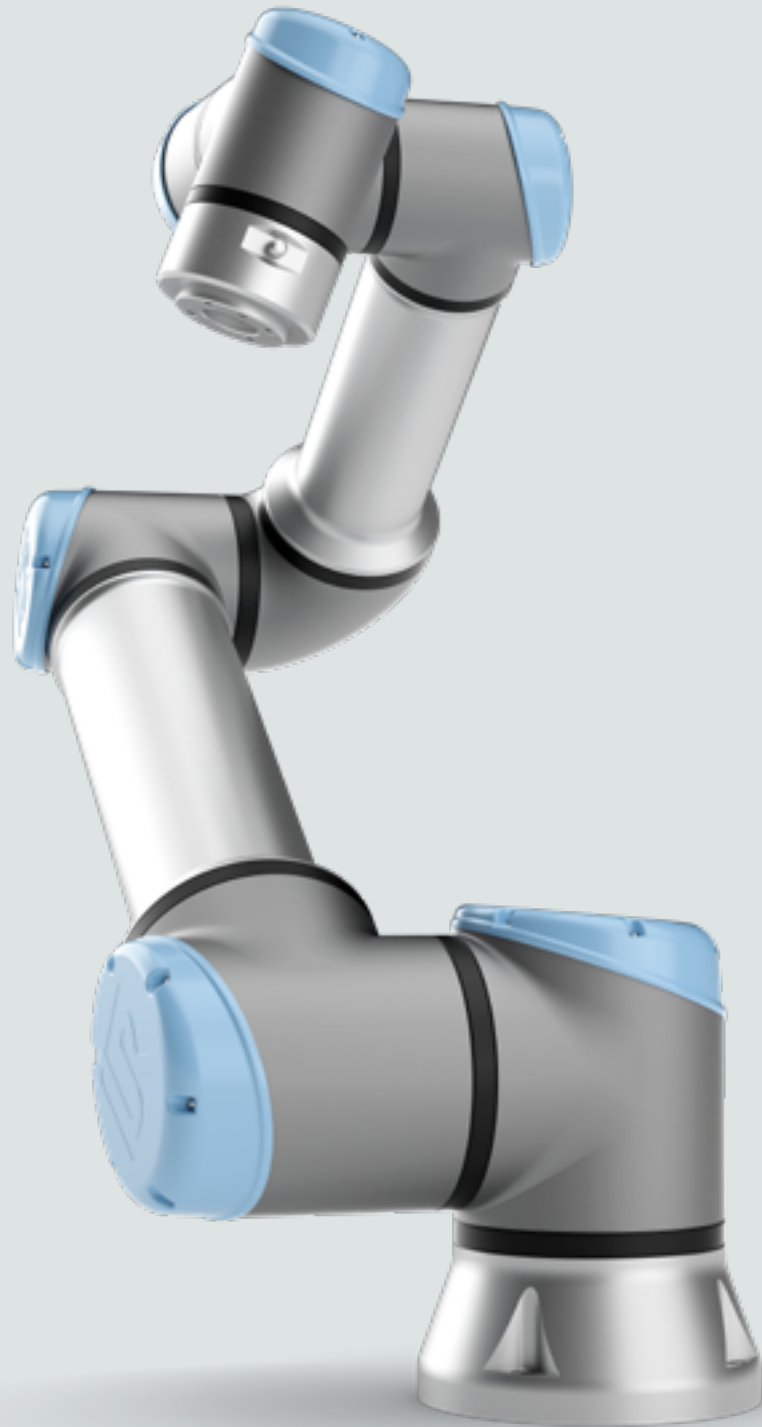
#1 Project scope

#2 In-house resources

#3 Project risk (and return)

#3 Project urgency





Project urgency

As the saying goes, “Time is money,” and that’s especially true in manufacturing. Fortunately, time to deployment is one of the many strengths of a cobot solution compared to a traditional robot workcell. In addition to being safe for human collaboration, cobots are considered “rapid deployment robotics,” which can provide manufacturers with a competitive advantage.

The need for a cobot application might be based on a chronic labor shortage, a need for labor savings to meet new customer demands or the loss of a

skilled machinist. Perhaps a \$500,000 CNC machine is sitting idle because the company is unable to hire operators to load and unload it during production. Each of these situations brings a different level of urgency. Generally speaking, the more urgent the need, the more aggressive the workcell development schedule and the more pressure to use external integration services to mitigate potential delays.

Internal Resources

Short development schedules are easier to meet for organizations that have considerable internal resources. Common questions here include: Can these resources work on the project full-time or only part-time? Do the in-house resources have automation experience? Do they have specialized training, such as training in safety protocols? Do they know how to do a risk assessment? What level of project management skills do they have?

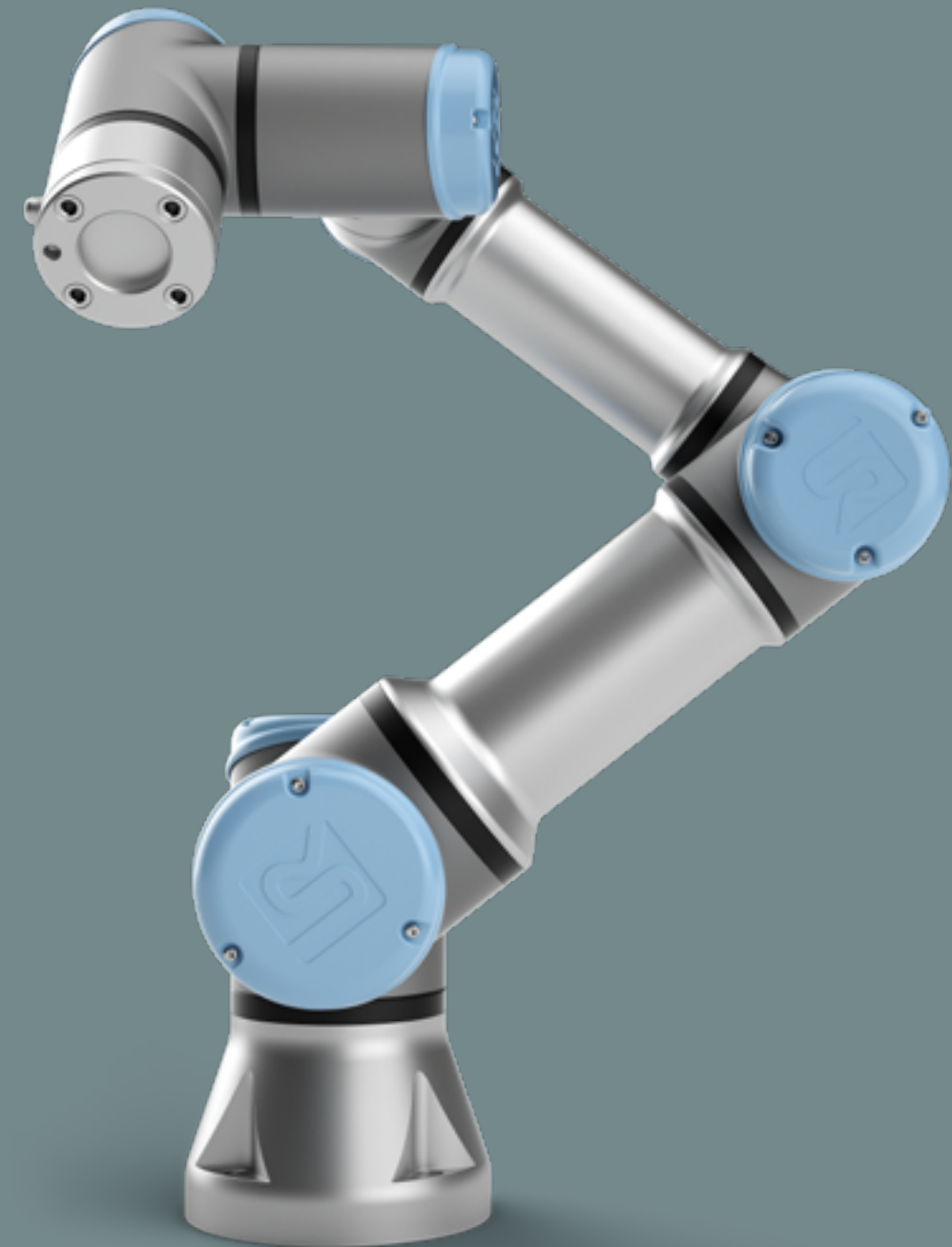


Project Risk

In addition to the general Application Risk Scorecard ratings, evaluate the tolerance and accuracy that your application will need to achieve:

- Does the simulation or estimate show that the project will require more than 70% of the rated payload?
- More than 70% of the rated speed?
- More than 70% of the maximum work envelope or reach?
- • More than 70% of the stated repeatability of the robot?

Any one of these questions represents a risk factor and requires greater experience to carefully manage. **If a manufacturer answers yes to multiple criteria, that indicates the necessity of getting the highest skilled integration resource available.** Also, consider business and production issues that could further impact project risk. For example, what is the customer impact of missing the installation and start-up schedules? Similarly, what is the impact of missing throughput or production goals? The same questions apply to quality. Lastly, consider the budget. If estimates are too low and you need additional resources, is there flexibility in the budget? All these factors should feed into a decision about how best to approach systems integration work.



Project scope

Finally, the project scope is usually the biggest consideration when evaluating a decision to DIY or seek outside help. Common questions raised to evaluate project scope include:



#1

Will the cobot installation be a single cell, multiple cells, or an entirely new production line? (With each choice bringing different levels of complexity and scale).

#2

What additional equipment is required for this project? How mature is that technology? How complex is it?

#3

Does the project require a programmable logic controller (PLC) or an HMI?

#4

Will the application be adaptive, requiring sensors, complex machine vision, lasers, or other components and subsystems (again adding complexity)?

#5

Will the solution interface with an enterprise resource planning (ERP) system?

Moving Ahead With Success

For a small-scope, lower-cost, less-complex project with a relaxed production schedule, go with a DIY solution. As complexity, risk, and schedules compound, strongly consider bringing in a professional integrator with the time, expertise and resources to guarantee success. That integrator may be a value-added distributor, a lean integrator, or—for large projects and applications with the highest complexity—a traditional integrator.



About Universal Robots

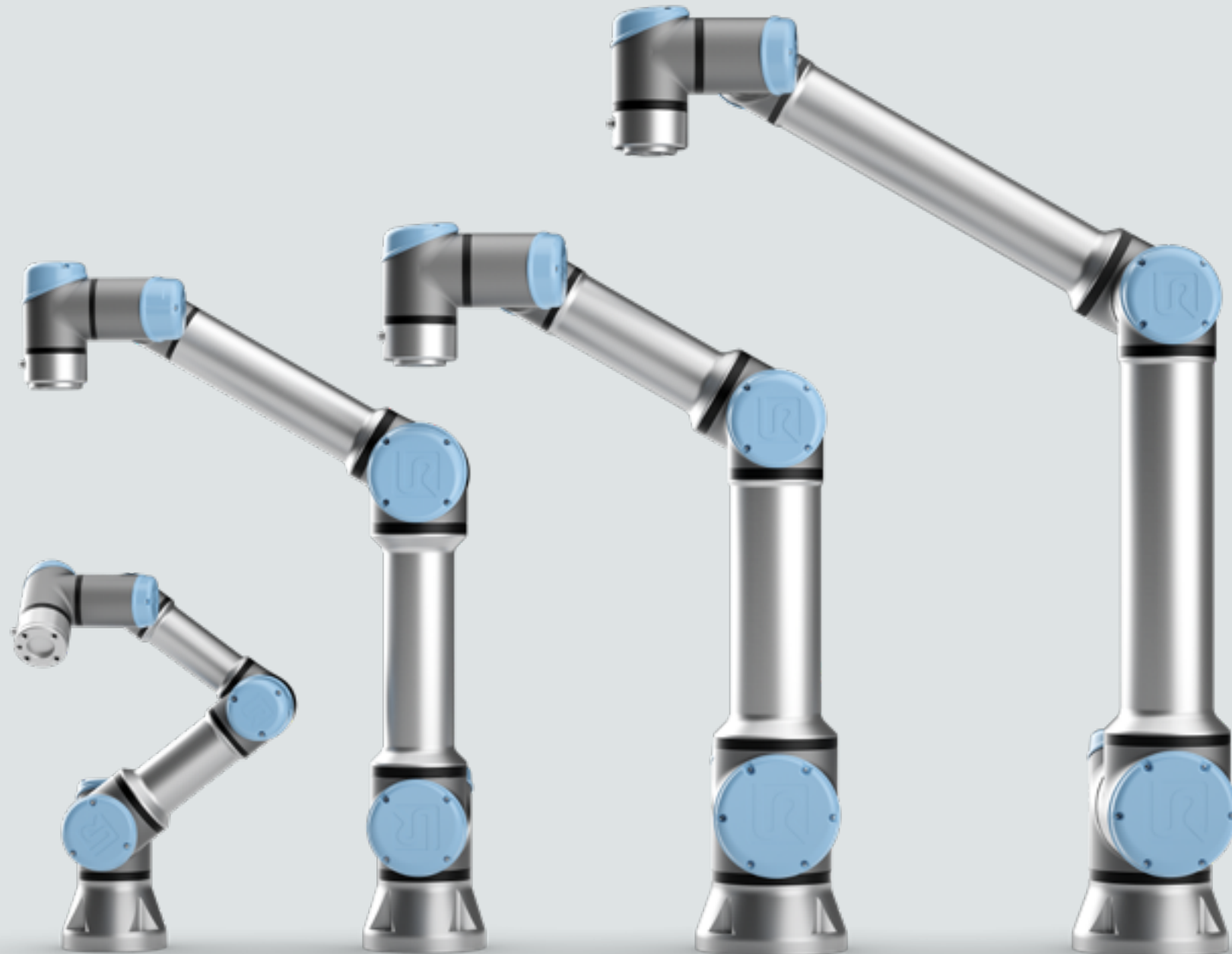
Universal Robots is the market leader in collaborative robots. Since introducing the world's first commercially viable cobot in 2008, UR has developed a product portfolio including the UR3, UR5, UR10, and UR16, reflecting a range of reaches and payloads. Each model is supported by a host of Plug & Produce end effectors, software, and accessories in the UR+ certification program, allowing for flexible redeployment of one robot into several diverse applications. Universal Robots has installed over 50,000 cobots worldwide automating every manufacturing industry. Headquartered in Odense, Denmark, UR operates out of 21 regional offices in the Americas, Europe, and Asia-Pacific.

Find out more

For additional information about automation using cobots from Universal Robots, please visit:

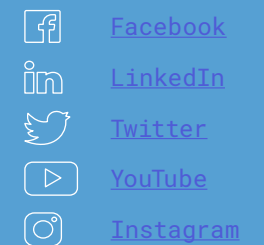
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